



US006978921B2

(12) **United States Patent**
Shelton, IV et al.

(10) **Patent No.:** **US 6,978,921 B2**
(45) **Date of Patent:** **Dec. 27, 2005**

(54) **SURGICAL STAPLING INSTRUMENT
INCORPORATING AN E-BEAM FIRING
MECHANISM**

(75) Inventors: **Frederick E. Shelton, IV**, Hillsboro,
OH (US); **Michael Earl Setser**,
Burlington, KY (US); **William Bruce
Weisenburgh, II**, Maineville, OH (US)

(73) Assignee: **Ethicon Endo-Surgery, Inc.**,
Cincinnati, OH (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/443,617**

(22) Filed: **May 20, 2003**

(65) **Prior Publication Data**

US 2004/0232197 A1 Nov. 25, 2004

(51) **Int. Cl.**⁷ **A61B 17/072**

(52) **U.S. Cl.** **227/176.1; 227/19; 227/180.1**

(58) **Field of Search** **227/175.1, 175.2,
227/175.4**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,031,814 A	7/1991	Tompkins et al.
5,071,052 A	12/1991	Rodak et al.
5,137,198 A	8/1992	Nobis et al.
5,397,046 A	3/1995	Savage et al.
5,413,267 A	5/1995	Solyntjes et al.
5,413,268 A	5/1995	Green et al.
5,445,304 A	8/1995	Plyley et al.
5,465,895 A	11/1995	Knodel et al.

5,484,095 A	1/1996	Green et al.
5,535,937 A	7/1996	Boiarski et al.
5,584,425 A	12/1996	Savage et al.
5,624,452 A *	4/1997	Yates 606/139
5,680,983 A	10/1997	Plyley et al.
5,692,668 A *	12/1997	Schulze et al. 227/175.1
5,709,334 A	1/1998	Sorrentino et al.
5,735,445 A	4/1998	Vidal et al.
5,918,791 A	7/1999	Sorrentino et al.
6,010,054 A	1/2000	Johnson et al.
6,032,849 A	3/2000	Mastri et al.
6,079,606 A	6/2000	Milliman et al.
6,109,500 A	8/2000	Alli et al.
6,786,382 B1 *	9/2004	Hoffman 227/178.1
2001/0029384 A1	10/2001	Nicholas et al.
2001/0030219 A1 *	10/2001	Green et al.

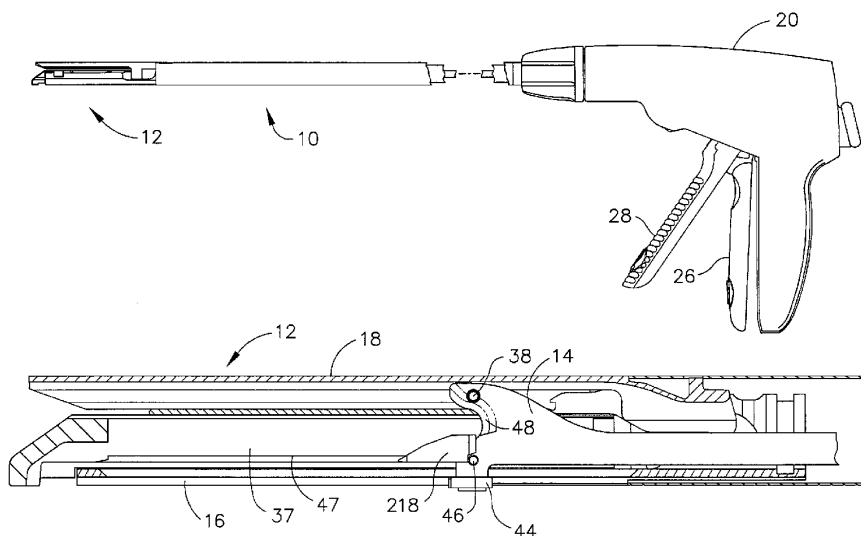
* cited by examiner

Primary Examiner—Scott A. Smith
Assistant Examiner—Gloria R. Weeks
(74) *Attorney, Agent, or Firm*—Dean Garner

(57) **ABSTRACT**

A surgical severing and stapling instrument clamps, suitable for laparoscopic and endoscopic clinical procedures, clamps tissue within an end effector of an elongate channel pivotally opposed by an anvil. An E-beam firing bar moves distally through the clamped end effector to sever tissue and to drive staples on each side of the cut. The E-beam firing bar affirmatively spaces the spaces the anvil from the elongate channel to assure properly formed closed staples, especially when an amount of tissue is clamped that is inadequate to space the end effector. In particular, an upper pin of the firing bar longitudinally moves through an anvil slot and a channel slot is captured between a lower cap and a middle pin of the firing bar to assure a minimum spacing.

17 Claims, 17 Drawing Sheets



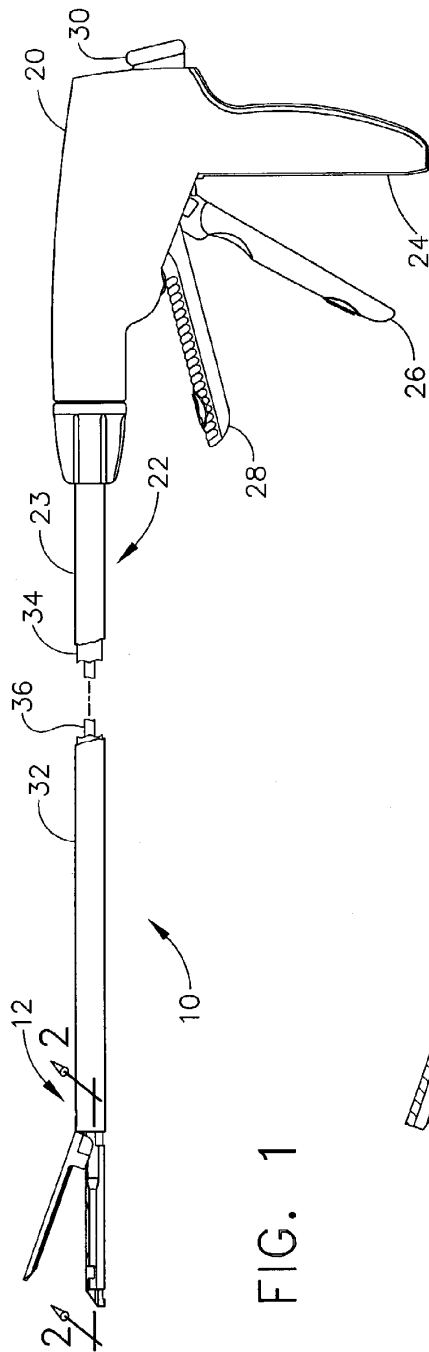


FIG. 1

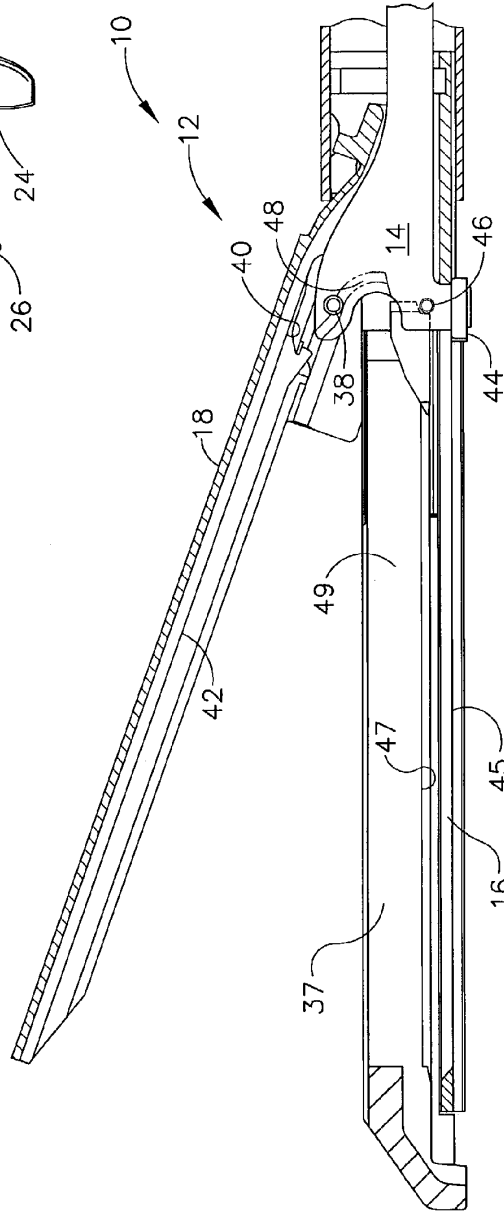


FIG. 2

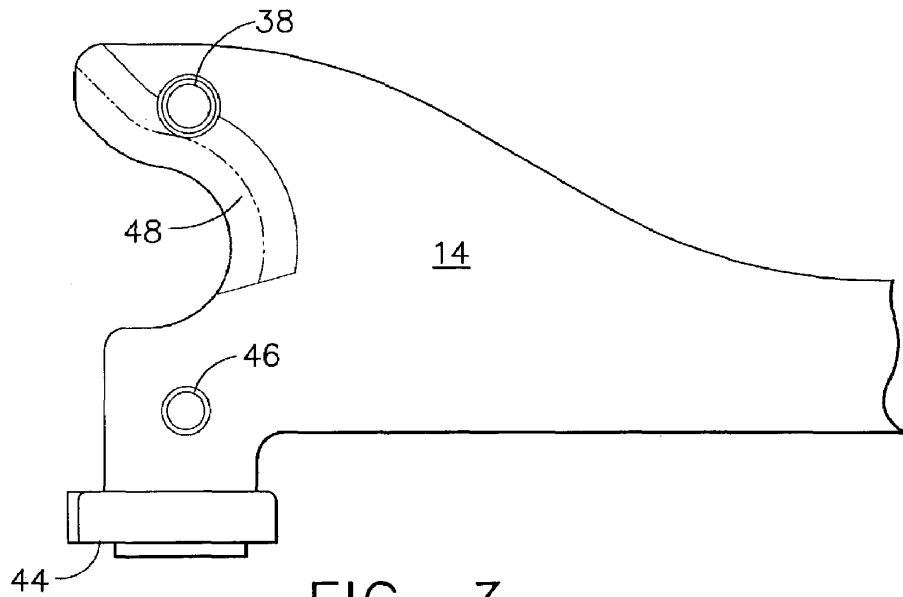


FIG. 3

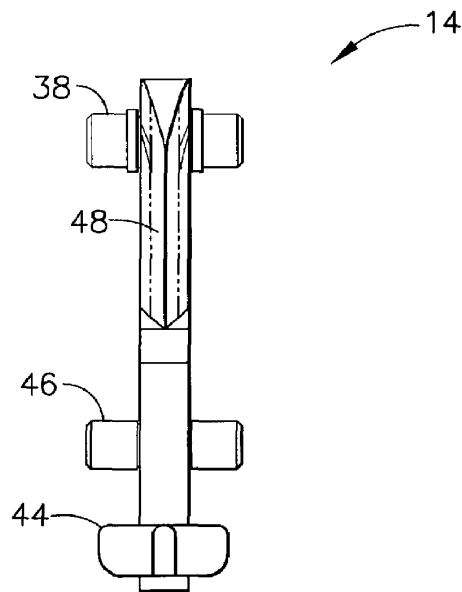


FIG. 4

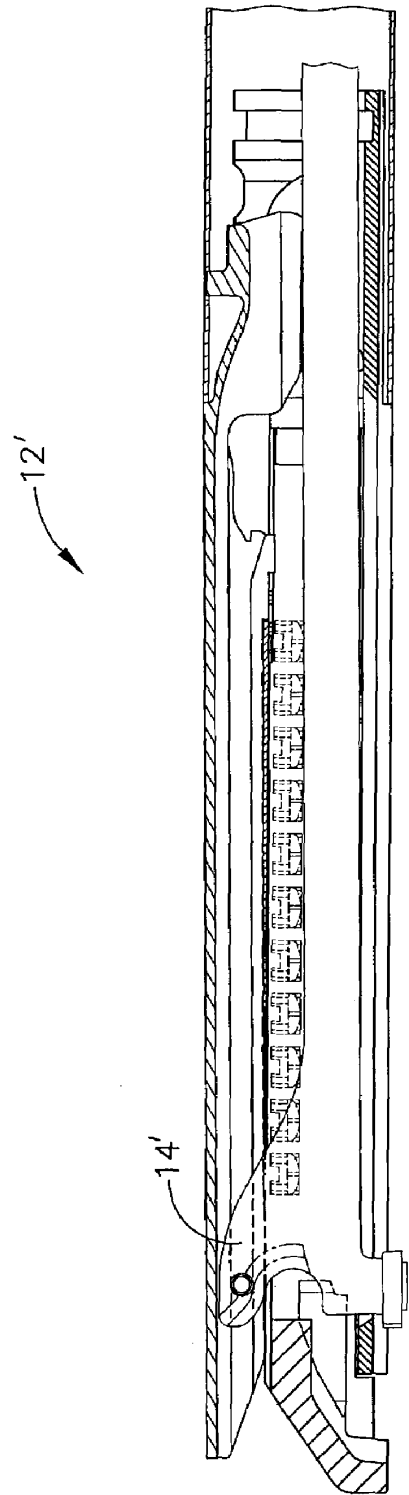


FIG. 5

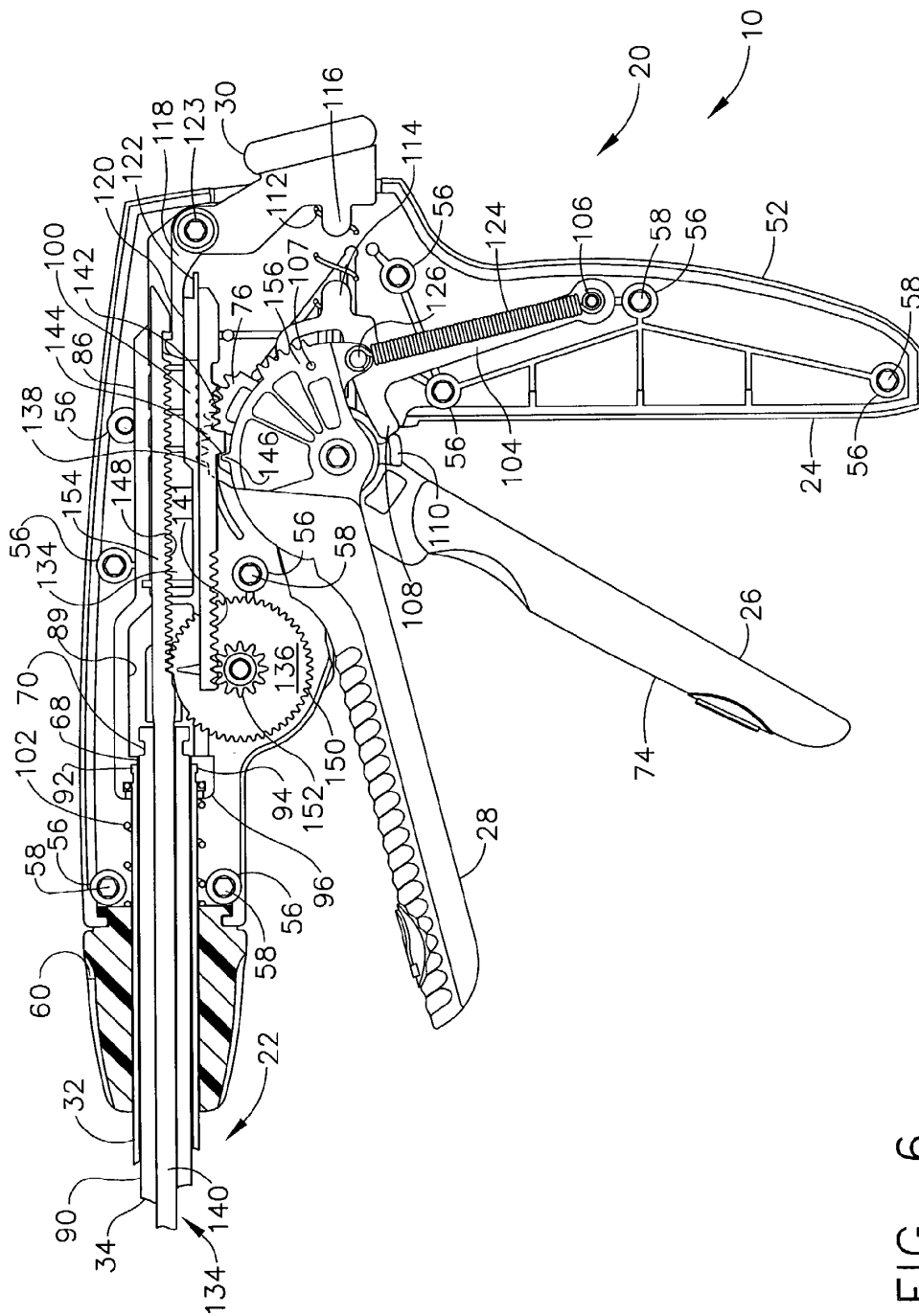


FIG. 6

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.